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CSC 123-03
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Project #5 - Data Structures and Generics

Java Code:

```
import java.util.*;
public class Project5{

    public static ArrayList<Integer> iterativeReverseList(ArrayList<Integer> arraylist){
        int[] listarr=new int[arraylist.size()];

        for(int counter = arraylist.size() - 1, j = 0; counter >= 0 && j <
arraylist.size(); counter--,j++){
            listarr[j] = arraylist.get(counter);
        }

        ArrayList<Integer>reverselist=new ArrayList<Integer>();

        for(int j = 0; j < listarr.length; j++){
            reverselist.add(j, listarr[j]);
        }

        return reverselist;
    }

    private static ArrayList<Integer> recursiveReverseList(ArrayList<Integer>
arraylist) {
        if(arraylist.size() > 1){
            Integer val = arraylist.remove(0);
            recursiveReverseList(arraylist);
            arraylist.add(val);
        }

        return arraylist;
    }

    public static ArrayList<Integer> insertSort(ArrayList<Integer> arraylist) {
```

```

int[] array=new int[arraylist.size()];

for(int j = 0;j < arraylist.size(); j++){
    array[j] = arraylist.get(j);
}

for (int j = 1; j < array.length; j++) {
    int key = array[j];
    int i = j-1;
    while((i > -1) && (array [i] > key)){
        array [i+1] = array [i];
        i--;
    }
    array[i+1] = key;
}

ArrayList<Integer> sortedlist=new ArrayList<Integer>();

for(int j = 0;j < arraylist.size(); j++){
    sortedlist.add(j, array[j]);
}

return sortedlist;
}

```

//Example Test method

```

public static void main(String[] args) {
    ArrayList<Integer>list=new ArrayList<Integer>();
    list.add(1);
    list.add(2);
    list.add(3);
    list.add(4);
    list.add(5);
    list.add(6);
    list.add(7);
    list.add(8);
    list.add(9);
    list.add(10);
    list.add(11);
}

```

```
list.add(12);
list.add(13);
list.add(14);
list.add(15);
list.add(16);
list.add(17);
list.add(18);
list.add(19);
list.add(20);
System.out.println("Starting List: " + list + "\n");
ArrayList<Integer> arr =iterativeReverseList(list);
System.out.println("Reverse List in Iteration: " + arr.toString() + "\n");
ArrayList<Integer> rever = recursiveReverseList(list);
System.out.println("Reverse List in Recursion: " + rever.toString() + "\n");
System.out.println("Sorted List: " + insertSort(list));
    }
}
```

Test Results:

```
Declaration @ Javadoc Problems Console ✕
<terminated> Project5 [Java Application] /Library/Java/JavaVirtualMachines/jdk1.8.0_121.jdk/Contents/Home/bin/java (May 13, 2017, 10:01:42 PM)
Starting List: [11, 12, 13, 14, 15, 16, 17, 18, 19, 20, 1, 2, 3, 4, 5, 6, 7, 8, 9, 10]

Reverse List in Iteration: [10, 9, 8, 7, 6, 5, 4, 3, 2, 1, 20, 19, 18, 17, 16, 15, 14, 13, 12, 11]

Reverse List in Recursion: [10, 9, 8, 7, 6, 5, 4, 3, 2, 1, 20, 19, 18, 17, 16, 15, 14, 13, 12, 11]

Sorted List: [1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15, 16, 17, 18, 19, 20]
```

```
Declaration @ Javadoc Problems Console ✕
<terminated> Project5 [Java Application] /Library/Java/JavaVirtualMachines/jdk1.8.0_121.jdk/Contents/Home/bin/java (May 13, 2017, 9:59:36 PM)
Starting List: [1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15, 16, 17, 18, 19, 20]

Reverse List in Iteration: [20, 19, 18, 17, 16, 15, 14, 13, 12, 11, 10, 9, 8, 7, 6, 5, 4, 3, 2, 1]

Reverse List in Recursion: [20, 19, 18, 17, 16, 15, 14, 13, 12, 11, 10, 9, 8, 7, 6, 5, 4, 3, 2, 1]

Sorted List: [1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15, 16, 17, 18, 19, 20]
```